Antennae and solar cells on one surface

A satellite equipped with new solar antennas, developed by the EPFL (Ecole Polytechnique Federale de Lausanne), will be part of the payload on the Russian rocket Cosmos, scheduled for launch from Plesetsk, Russia. This satellite incorporates advanced technology, that combines antenna functions and solar cells on a single surface.

The rocket's payload will also include a satellite designed and built by students from several European universities, including a group of EPFL students. Because of the enormous cost of getting to their destination, structures used in space applications have to be lighter, smaller, and more reliable than their Earth-bound counterparts.

In confronting this challenge, the European Space Agency (ESA) drew upon the recognised expertise of the Electromagnetics and Acoustics Laboratory (LEMA) at the EPFL in Switzerland, asking them to develop a single surface that could function as both antenna and solar cell array.

As EPFL professor Juan Mosig notes, "The planar antennas have plenty of quiet real estate available for solar cells," and a combined surface is ideal as it results in a substantial efficiency gain and weight reduction for the satellite.

Advances in both solar cell and antenna technology have been made in the development of the antenna, nicknamed Asolant (Advanced SOLar ANTenna). Six years after initiation, it's ready for its new life in space.

The structure is light and thin. It's strong and provides its own source of energy. Its gallium arsenide solar cells are adapted to the conditions of space. The antenna will communicate with Earth, sending and receiving GPS signals, as well as signals from mobile telephone networks such as Orbcomm.

"For on-going satellite/space applications the ESA requests GaAs cells since they have the best efficiency (although they are very expensive and not so robust). For eventual on-Earth ground applications, amorphous silicon has been tested with good results. All solar cells need to be tested for compatibility with electro-magnetic radio frequencies and microwave radiation," adds Professor Mosig.

The Zurich-based firm HTS handled the antennas' manufacture, and the structure will ride aboard a Rubin satellite, adapted to the Electromagnetics and Acoustics Lab's specifications by the German company, OHB Systems.

The undoubted commercial advantage of antennae, combined with photovoltaics. ***Source*** *global.kyocera.com/ news/2005/images/image_web.jpg*

Because Asolant is autonomous, providing its own power source with the solar cells on its surface, it also has the potential for many exceedingly practical Earth-based applications.

Sheets of solar antennae on residential rooftops could simultaneously power the home, send and receive TV, radio and wireless phone and internet signals. Buoy-based solar antennas could improve atmospheric and oceanic data-gathering capabilities, providing better early-warning systems for hurricanes, tsunamis and other natural disasters.

Solar antennas could be used in increasingly power-hungry cell phones and information from remote regions could be sent via autonomous transmitters.

The EPFL's Electromagnetics and Acoustics Lab has spun off Swiss start-up company, JAST, that is in the process of studying the market possibilities of these kinds of applications.

The Cosmos rocket will also launch a student satellite. This ESA-sponsored project, carried out in the framework of the Student Space Exploration and Technology Initiative (SSETI), caught the attention of a small group of EPFL students. The electronics they developed will contribute to the satellite's propulsion system, according to PhD student Renato Krpoun. After undergoing several tests in the first few months in orbit, the satellite will ultimately function as an amateur radio transponder.

Northrop-Grumman takes SAT-DSA

SAT Corporation, a subsidiary of Integral Systems, Inc has delivered its digital spectrum analyser, SAT-DSA, to Northrop-Grumman.

SAT-DSA is a state-of-the-art digital spectrum analyser tailored for the SATCOM industry.

The system provides automatic monitoring of multiple uplink and downlink signals and does this in a fraction of the time of a classic spectrum analyser.

SAT-DSA is the latest member of SAT's carrier monitoring products, including Monics and SigMon spectrum monitoring systems.

SAT-DSA includes the ability to: automatically detect, characterise and display interfering signals, access historical spectral data and signal characteristics, as well as support remote user access and carrier line up activities.

"We are pleased Northrop-Grumman selected SAT-DSA to support their customer's carrier monitoring requirements," said Bob Potter, President and CEO at SAT.

"Northrop-Grumman performed a thorough analysis of the features offered by SAT and its products, prior to this purchase. The combination of proven features designed specifically for the SATCOM industry, and relative low cost, made SAT-DSA a clear choice for them."

Similar systems are used by SES Americom, SES Astra, New Skies Satellites, Shin Satellite Public Company Ltd., Loral Skynet, Hispasat, SATMEX, Hellasat and JSAT Corp.

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